CLAIMS

1. A method of screening for a flavivirus in a subject or animal host comprising:
   a) contacting a sample from the subject or animal with a composition comprising a flavivirus envelope protein domain III polypeptide under conditions that permit formation of specific immunocomplex between an antibody in the sample and the envelope protein domain III polypeptide; and
   b) detecting whether a specific immunocomplex is formed.

2. The method of claim 1, wherein the envelope protein domain III polypeptide is a yellow fever virus envelope protein domain III polypeptide, West Nile virus envelope protein domain III polypeptide, St. Louis encephalitis virus envelope protein domain III polypeptide, Murray Valley encephalitis virus envelope protein domain III polypeptide, tick borne encephalitis serocomplex virus envelope protein domain III polypeptide or a combination thereof.

3. The method of claim 1, wherein the envelope protein domain III polypeptide is not a dengue fever virus envelope domain III polypeptide.

4. The method of claim 1, wherein the envelope protein domain III polypeptide is not a fusion protein.

5. The method of claim 1, wherein the envelope protein domain III polypeptide is a West Nile virus envelope protein domain III polypeptide.

6. The method of claim 1, wherein the envelope protein domain III polypeptide comprises an amino acid sequence that has at least an 80% identity with SEQ ID NO:11.

7. The method of claim 6, wherein the envelope protein domain III polypeptide comprises an amino acid sequence that has at least an 85% identity with SEQ ID NO:11.

8. The method of claim 7, wherein the envelope protein domain III polypeptide comprises an amino acid sequence that has at least an 90% identity with SEQ ID NO:11.

9. The method of claim 8, wherein the envelope protein domain III polypeptide comprises an amino acid sequence that has at least an 95% identity with SEQ ID NO:11.

10. The method of claim 1, wherein the envelope protein domain III polypeptide comprises amino acids 292 to 402 as set forth in SEQ ID NO:3 or an amino acid sequence set forth in SEQ ID NO:8-21.

11. The method of claim 1, wherein the envelope protein domain III polypeptide comprises an amino acid sequence as set forth in SEQ ID NO:8-20.

12. The method of claim 1, further comprising at least a second envelope protein domain III polypeptide.

13. The method of claim 1, wherein the immunocomplex is detected using anti-antibody secondary reagents.

14. The method of claim 1, wherein the immunocomplex is detected by ELISA.

15. The method of claim 1, wherein the immunocomplex is detected by Western blotting.

16. The method of claim 1, wherein the immunocomplex is detected by peptide array.

17. The method of claim 1, wherein the subject is a bird.

18. The method of claim 1, wherein the antibody is an IgA, IgM or IgG antibody.

19. The method of claim 1, wherein the envelope protein domain III polypeptide is obtained from a bacteria, a mammalian or an insect cell comprising an expression vector encoding the envelope protein domain III polypeptide.

20. The method of claim 1, wherein the subject is infected with West Nile virus or a tick borne encephalitis serocomplex virus.

21. A composition comprising an isolated West Nile virus or tick borne encephalitis serocomplex virus envelope protein domain III polypeptide.

22. The composition of claim 21, wherein the West Nile virus envelope protein domain III polypeptide is derived from West Nile strain 382-99, EthAn4766, 385-99, Kunjin MRM16, Golblum, TL443, DakAnMg798, or 804994

23. The composition of claim 21, wherein the West Nile virus envelope protein domain III polypeptide comprises an amino acid sequence that is at least 80% identical to SEQ ID NO:11.

24. The composition of claim 23, wherein the West Nile virus envelope protein domain III polypeptide comprises an amino acid sequence that is at least 85% identical to SEQ ID NO:11.

25. The composition of claim 24, wherein the West Nile virus envelope protein domain III polypeptide comprises an amino acid sequence that is at least 90% identical to SEQ ID NO:11.

26. The composition of claim 25, wherein the West Nile virus envelope protein domain III polypeptide comprises an amino acid sequence that is at least 95% identical to SEQ ID NO:11.

27. The composition of claim 26, wherein the West Nile envelope protein domain III polypeptide comprises amino acids 292 to 402 as set forth in SEQ ID NO:3 or an amino acid sequence set forth in SEQ ID NO:11.

28. The composition of claim 21, wherein the envelope protein domain III polypeptide is operatively linked to a substrate.

29. The composition of claim 28, wherein the substrate is a microtiter plate, a bead or a microarray.

30. The composition of claim 21, wherein the composition is a vaccine composition.

31. The composition of claim 30, further comprising an adjuvant.

32. A kit for screening for flavivirus antibodies, in a suitable container means, comprising at least one envelope protein domain III polypeptide.

33. The kit of claim 32, wherein the at least one envelope protein domain III polypeptide is a yellow fever virus envelope protein domain III polypeptide, West Nile virus envelope protein domain III polypeptide, St. Louis encephalitis virus envelope protein domain III polypeptide, Murray Valley encephalitis virus envelope protein domain III polypeptide, a Central European encephalitis (CEE) virus envelope protein domain III polypeptide, a louping ill (LI) virus, a Russian spring-summer encephalitis (RSSE) virus envelope protein domain III polypeptide, a Langat (LGT) virus envelope protein domain III polypeptide, a Powassan virus (POW) envelope protein domain III polypeptide, an Alkhurma (ALK) envelope protein domain III polypeptide, a Kyasanur Forest disease (KFD) virus envelope protein domain III polypeptide, an Omsk hemorrhagic fever (OHF) virus envelope protein domain III polypeptide or a combination thereof.

34. The kit of claim 32, wherein at least one envelope protein domain III polypeptide is a West Nile virus envelope protein domain III polypeptide.

35. The kit of claim 32, wherein the envelope protein domain III polypeptide comprises one or more of amino acids 292 to 402 as set forth in SEQ ID NO:3 or an amino acid sequence set forth in SEQ ID NO:8-20.

36. The kit of claim 32, further comprising a non-reactive solid support to which the at least one envelope protein domain III polypeptide is attached.

37. The kit of claim 32, further comprising a first agent that detects an immunocomplex comprising the envelope protein domain III polypeptides.

38. The kit of claim 37, wherein the first and second agents are secondary antibodies that specifically bind flavivirus antibodies.

39. The kit of claim 37, wherein the first and second agents comprise a detectable label.

40. The kit of claim 39, wherein the detectable label is fluorescent, radioactive, colorimetric, or enzymatic.

41. A kit for screening for West Nile virus antibodies in a subject comprising:

a) an assay plate comprising a multiplicity of microtiter wells comprising a composition comprising at least one envelope protein domain III polypeptide capable of binding a flavivirus antibody in the sample that can specifically bind to at least one envelope protein domain III polypeptide; and

b) a container means comprising a labeled secondary antibody having specific binding affinity for a flavivirus antibody in the sample that can specifically bind to at least one envelope protein domain III polypeptide.

42. A kit for screening for TBE serocomplex antibodies in a subject comprising:

a) an assay plate comprising a multiplicity of microtiter wells comprising a composition comprising at least one envelope protein domain III polypeptide capable of binding a flavivirus antibody in the sample that can specifically bind to at least one envelope protein domain III polypeptide; and

b) a container means comprising a labeled secondary antibody having specific binding affinity for a flavivirus antibody in the sample that can specifically bind to at least one envelope protein domain III polypeptide.

43. A method of screening for flavivirus in a subject comprising:

a) contacting a sample from the subject with a composition from the kit of claim 32; and,

b) detecting whether an immunocomplex is formed between an antibody and the at least one envelope protein domain III polypeptide.